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VEGETABLE PHYSIOLOGY.[1]

What becomes of the Flagella ?—Some authors have insisted that the flagella of swarm spores are finally absorbed into the body of the spore, while others have maintained that they are cast off. In a recently published paper embodying the results of many careful examinations (Ueber das Schicksal der Cilien bei den Zoosporen der Phycomyceten) Rothert shows that both views are correct. In the second swarm stage of Saprolegnia and in the Peronosporeae the flagella are either cast off as soon as the spore comes to rest or soon after, or else they remain attached to the spore indefinitely, even after germination. In the first swarm stage of Saprolegnia, however, he found to his surprise that they are as uniformly drawn back into the body of the protoplasm, the withdrawal being slow at first and then quite rapid. In both cases, more especially in the former, the old flagella are strongly inclined to turn back on themselves and form fused loops, the reason for which is not very apparent. These loops are formed while the flagellum is attached to the spore or after it has been cast off and may occur in any part of it, the straight part of the flagellum being drawn back into the loop which becomes, thereby, little if any larger, but increases noticeably in thickness. These loops usually form within 1 to 3 minutes after the spore comes to rest. The author believes the looping movement is due to the vital activity of the flagellum, the subsequent drawing in of the straight part being accounted for by surface tension. He points out that purely physical causes would leave the flagella straight, or cause them to swell, or make them contract into balls. While not committing himself to the view, it is suggested that possibly the flagella are formed out of a special cytoplasm existing only in small quantity, and that at the end of the first swarm stage of diaplanetic swarm spores this is carefully husbanded for future use. The observations were made on Pythium complens, on a member of an undescribed genus nearest related to Phytophthora, on Saprolegnia monoica, and on an undetermined species of Saprolegnia, the spores being sown in hanging drops.—ERWIN F. SMITH.

Perithecial Stage of the Apple-Scab Fungus.—In *Berichte d. d. bot. Gesellschaft* XII, 9, pp. 338–342 R. Aderhold describes the results of his observations and cultures, concluding that Venturia chlorospora f. Mali is the much sought for ascosporous stage of Fusicladium dendriticum (Wallr.). In culture media of apple and pear broth and the same with addition of gelatin, he found the mycelium and conidia obtained from the ascospores of the Venturia to be identical with those obtained from the conidia of the Fusicladium taken directly from the host plant. He did not succeed in growing perithecia either from ascospores or conidia, neither was he able to demonstrate that the scab can be produced by inoculations with these ascospores, owing to the fact that his experiment was tried in a locality where the disease made its appearance in unexpected abundance so as to confuse results. The evidence, therefore, rests on association and the supposed identity of the fungi which he obtained from ascospores and from conidia. The author states that without previous knowledge it was impossible to tell whether a given culture was derived from a conidium or an ascospore, and maintains that even without inoculatians he has fully established the genetic relationship of the two fungi, this argument will not, however, be fully convincing to others. The perithecia are round to oval with club-shaped, 8-spored asci; spores brown, 2-celled, the forward end smaller, 11–15x7–8μ. At Proskau in 1893, the asci were ripe the last of March, in 1894, the middle of April. In gelatin cultures the mycelium penetrated to the depth of a centimeter and formed superficially a dense black down, becoming gray-black with age. No pycnidia were observed, but round or oval pseudo-parenchymatic bodies finally formed in the cultures, and these were supposed to be incipient perithecia. Two closely related species of Venturia (V. chlorospora and V. ditricha f. piri) were found on old pear leaves attacked by Fusicladium, and because the extruded ascospores are exactly alike, so that the author could not tell with which he was working, the identity of apple and pear scab is also left for future determination. Altogether it would seem to have been better had the author held back the paper so as to include the results of another year, inasmuch as he intends to continue the investigation.—ERWIN F. SMITH.

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Poisonous Cactaceae.—The reports of certain Mexican travellers (last of all Lumholtz) that the Indians of that region become intoxicated by eating certain species of cactus seem to have more truth in them than botanists generally have been willing to admit. Recently from Anhalonium Lewinii of northern Mexico, Lewin has isolated an alkaloïd anhalonin, which is said to resemble the alkaloids found in many species of Strychnos. It was obtained pure, and both warm and cold blooded animals were subjected to its effects. Per kilo of the animals experimented upon 0.02–0.04 grams caused severe poisoning and 0.16–0.20 grams caused death. This is not the only poisonous cactus. Four other species of Anhalonium (Echinocactus) were examined and found to be poisonous in varying degrees. Of the genus Mammillaria five species were examined, one of which (M. uberiformis) is noxious. More surprising still, the juice of Rhipsalis conferta was also found to be poisonous to cold blooded animals. The author thinks that other species of cacti will turn out to be poisonous, and expresses the hope that some of the alkaloids may be of service in medicine. These notes are from *Ber. d. d. bot. Gesellschaft,* XII, 9, pp. 283–290. Another paper by the same author giving the toxicological, chemical and crystallographical data in detail may be found in *Archiv f. ex. Path. u. Pharmak.,* Bd., 34, 1894.—Erwin F. Smith.

Rothert on Heliotropism.—The last number of Cohn's *Beiträge* (No. 1, Bd. VII, pp. VIII, 212) is wholly given up to a paper on Heliotropism by Dr. W. Rothert, privat docent of the University of Kazan. Many experiments were performed with monocotyledonous and dicotyledonous seedlings, leaf-blades, petioles and stems, and some interesting results were obtained which it may be possible to abstract hereafter. Among other things he concludes that Wiesner's "Zugwachstum" has no foundation in fact. There are no plates, but many simple figures illustrating curvatures are introduced into the text. The work was done in Leipsic in Dr. Pfeffer's laboratory.—Erwin F. Smith.

Austro-German Views on Botanical Nomenclature.—At the 66th meeting of the German Naturalists and Physicians held in Vienna in September, 1894, the section of Systematic Botany passed the following resolutions:

(1) The rule that a name once used but subsequently invalid shall never again be used is to be recommended for future observance, but retroactive power (once a synonym always a synonym) shall not be given to this rule, and names which have been changed for this reason shall be rejected.

(2) As a rule, the original species name is to be retained when a species is removed from the original genus to another.

(3) In questions of priority the year 1753 shall be retained as the point of departure both for names of species and genera.

(4) In the naming of species the principle of priority should govern, but a sure name shall not be thrust aside for a doubtful one.

(5) In the naming of genera a name that has been disused for 50 years shall not be revived to displace one which has been in use.

(6) This rule permits of one exception, i. e., when the name in question has been in use 50 years since its revival.

These rules were drawn by two botanists of world-wide reputation, Drs. Ascherson and Engler, and are accompanied by some pages of explanation and remarks which deserve the serious attention of all who are interested in nomenclature. It is unnecessary to say that Otto Kuntze and his followers receive considerable attention and plenty of sharp criticism. Of course, as Briquet has already remarked concerning the rules adopted at Rochester and those suggested by himself and other individuals, these rules must be adopted by an International Congress before they can have any binding force. Botanical nomenclature is an international affair, and the absurdity of a few individuals or even all of a certain country getting together and trying to dictate to the rest of the world is self evident. The rules here translated and the remarks alluded to will be found in *Oesterreichische Botanische Zeitschrift*, XLV, No. I, Jan., 1895, pp. 27–35.— Erwin F. Smith.

Separation of Enzymes.—The 18th An. Rept. Conn. Agricultural Exp. Sta. (1894) contains a number of papers of interest, notably three by Thomas B. Osborne on The Proteids of the Rye Kernel, The Proteids of Barley, and the Chemical Nature of Diastase. On methods of extraction, he has the following:

"The usual method of preparing vegetable enzymes is to treat the aqueous or glycerin extract containing them with alcohol as long as a precipitate having fermentative power appears, to purify this by repeated precipitation from its solution in water, by means of alcohol, and finally to subject the aqueous solution to dialysis to remove salts. This method is wholly unsuited to yield pure preparations, because the precipitate produced by alcohol contains not only a large amount of carbohydrates and salts, but also nearly all of the various forms of proteid matter present in the extract.

"The most rational method (hitherto very little used) is first to separate the proteids from the carbohydrates and other soluble substances by saturating the extract with ammonium sulphate, thereby precipitating the ferment and proteids together, next to remove the proteid existing as globulin, by dialysis, and then, if possible, to separate the albumin and proteoses by fractional precipitation with alcohol." By this method a diastatic ferment was isolated from malt which was capable at 20° C. of producing "from soluble starch, over 2000 times its weight of maltose, and a further undetermined quantity of dexterin, within one hour."—Erwin F. Smith.